

*Carol J. Simon, PhD  
David Dranove, PhD  
William D. White, PhD*

Drs. Simon and White are with the University of Illinois at Chicago. Dr. Simon is an Associate Professor in the Institute of Government and Public Affairs and the School of Public Health. Dr. White is a Professor in the Institute of Government and Public Affairs and the Department of Economics. Dr. Dranove is a Professor in the Department of Management and Strategy, Kellogg School of Management, Northwestern University, Chicago.

*Address correspondence to Dr. White, Institute of Government and Public Affairs, University of Illinois, 921 West Van Buren, Suite 230, Chicago IL 60607; tel. 312-996-6189; fax 312-996-1404; e-mail <wdwhite@uic.edu>.*

# The Impact of Managed Care on the Physician Marketplace

## SYNOPSIS

**Objective.** To examine the impact of managed care on the employment and compensation of primary care and specialty physicians, as measured by changes in income, physician-to-population ratios, and specialty choices.

**Methods.** The authors used data from the American Medical Association's Socioeconomic Monitoring System survey, a nationally representative 1% random survey of post-residency patient-care physicians, and location data from the AMA Masterfile to evaluate the relationship between the growth in managed care from 1985 to 1993 and (a) inflation-adjusted physician incomes and (b) physician-to-population ratios for primary care physicians and specialists. They also used data from the National Residency Matching Program for 1989 through 1995 to look at trends in available positions and specialty choices.

**Results.** Primary care incomes grew 4.78% annually (\$33,526 cumulatively) in states with the highest managed care growth, compared to 1.20% (\$7448 cumulatively) in the lowest quartile of managed care growth. The difference in income growth for medical and surgical subspecialists between the highest and lowest quartiles was not statistically significant. The incomes of radiologists, anesthesiologists, and pathologists (RAPs) rose 0.14%, or \$1700, in the highest quartile versus 4.14% (\$58,558) in the lowest. Subspecialists per capita did not differ by quartile of managed care growth, but RAPs per capita increased fastest in states in the lowest quartile. Between 1989 and 1995, the number of family practice and pediatric residency positions that were filled rose 32%, while the number filled remained stable for medical and surgical subspecialists and the number of RAP positions filled fell 14%.

**Conclusions.** The growth in managed care has been associated with significant changes in physician incomes and practice locations. Between 1985 and 1993, states with the fastest growth in managed care penetration saw the highest rate of growth in primary care physicians' income and the slowest rate of growth in RAP physicians' income. At the same time, the number of RAP physicians grew most rapidly in those states with the lowest rate of managed care growth. Finally, between 1989 and 1995, there was a dramatic increase in the number of primary care residency positions filled and a marked decrease in the number of RAP residency positions filled across the country.

The growth of managed care has dominated recent changes in the medical marketplace. As of 1995, over 120 million Americans were enrolled in health maintenance organizations (HMOs) or preferred provider organizations (PPOs), up from 10 million in 1982,<sup>1</sup> and more than 83% of patient care physicians had at least one managed care contract.<sup>2</sup> Recent evidence suggests that managed care is changing the relative emphases on specialty and primary care.<sup>3-6</sup> This has far-reaching implications for the operation of the health care system and for public policies regarding the physician workforce. In this study, we used nationally representative survey data to evaluate the impact of managed care on the supply and demand for primary care and specialist physicians. Specifically, we looked at physician incomes and practice locations, and at the specialty choices of new physicians.

U.S. medicine has increasingly relied on medical specialists to deliver patient care. In 1980, specialists accounted for about 65% of all active physicians in the United States, while by 1993, the percentage of active physicians who were specialists had increased to 70%.<sup>7-8</sup> Reliance on specialists may add to the costs of care because specialists are more expensive to train than primary care physicians, have typically been paid substantially more, and may employ more expensive styles of treatment. In addition, extensive use of specialists may reduce continuity of care.<sup>9-14</sup>

In recent years, policy makers have addressed a perceived overuse of specialists with a variety of regulatory initiatives. These include adjustments to Medicare reimbursement levels for physician services under the RBRVS (Resource Based Relative Value Scale) and proposed enrollment caps for specialty training programs. If managed care reduces the incomes of specialists and discourages the training of new specialists, this raises questions about the need for such initiatives designed to address perceived imbalances in the physician marketplace.

There are several reasons to believe that physicians' earnings overall and the relative earnings of specialists and primary care providers will be affected by the expansion of managed care. Under managed care, the locus of decision-making about where consumers receive care and what care they receive has shifted from individual patients and their physicians toward insurers and employers. In the past, many consumers were insulated from the true price of care by generous insurance policies that paid for services on a fee-for-service basis and had low co-payments and deductibles. As a result, they had little incentive to engage in price-conscious shopping. In contrast, managed care plans realize the full amount of any cost savings. This provides strong incentives to be cost-conscious shoppers for care in general and to be concerned about the use of expensive specialist services in particular. Managed care plans are also able to take advantage of economies of scale in collecting price and quality information for use in selectively contracting with providers on the basis of price and treatment styles. The ability to use

large databases to evaluate the efficacy of using alternative treatments and types of personnel may also assist plans in developing strategies to contain costs.

Managed care plans have sought to directly control the use of specialists through utilization review and reliance on primary care physicians as "gatekeepers."<sup>15</sup> To the extent that plans' strategies involve greater use of primary care physicians and less reliance on specialists, the relative demand for different kinds of physicians will be affected. In particular, one would expect a greater reliance on primary care physicians and a reduced reliance on specialists to boost the compensation and employment opportunities of primary care physicians while reducing the compensation and employment opportunities of specialists.

A number of studies have shown that staff and group model HMOs use fewer specialists per capita than other patient care settings.<sup>16-19</sup> However, care must be exercised in extrapolating findings for staff HMOs to the broader marketplace. Issues exist about measuring the level of physician use associated with staff HMOs because such plans may use external physicians as well as those who are plan employees.<sup>20</sup> In any case, while staff and group model HMOs dominated the managed care market in the early 1980s, other forms of managed care—including PPOs, independent practice associations (IPAs), and point of service plans (POs)—have been growing much more rapidly. Staff and group model HMOs now account for only about 10% of the enrollees in managed care plans.<sup>21</sup> The workforce requirements under these other forms of managed care are not well documented.<sup>22</sup> Several recent studies suggest they may not significantly reduce the demand for physician services.<sup>23-24</sup>

There is also substantial evidence that relatively healthier individuals choose to enroll in managed care.<sup>25-26</sup> Healthier patients would use fewer health care services in any setting. If managed care organizations simply sort patients on the basis of their health status, the shift to managed care may not affect the overall use of various types of physician services, even though physician workforce requirements might vary substantially across different types of plans.

If managed care plans have increased reliance on primary care services and are de-emphasizing the use of specialists, what are the potential economic implications? Economic theories suggest that changes in the demand for physician services may affect compensation, location decisions, and specialty choices. Adjustments may occur most rapidly in compensation. In the short run, an increase in the use of primary care services may give rise to a scarcity of primary care physicians and cause their earnings to rise. This is not only because existing primary care physicians would be delivering more services but because competing managed care plans and other payers would tend to bid up fees and remuneration.

Similarly, a decline in the use of specialty care would generate a surfeit of specialists. Compensation levels would be depressed as patient volumes fall; specialists would be

forced to reduce fees to obtain contracts with payers or employers. If, however, specialists could find a way to increase the demand for their services, then the effect of declining prices would be partially offset by their prescribing additional services. However, existing evidence suggests that specialists could not induce enough demand to make up more than a small portion of the lost income.<sup>27-28</sup>

Overall, if managed care increases reliance on primary care services, we would expect that in markets with high managed care penetration, income growth would be relatively high for primary care physicians compared to specialists. Such a finding would be consistent with an increase in the use of primary care physicians, a reduction in the use of specialists, or both.

Short-run changes in income generate incentives for physicians to make longer-run adjustments in their practices. Physicians in markets in which incomes are declining may look to relocate to markets where incomes are stable or growing. We would also expect an increase in the number of physicians electing to enter primary care as well as a possible rise in the number of practicing specialists switching to primary care. Studies have found that physicians' choices of specialty training may be quite sensitive to expected lifetime earnings, suggesting that these long-run adjustments could be quite profound.<sup>29,30</sup>

While virtually all regions in the United States have witnessed the growth of managed care, the rates of growth and the levels of managed care penetration in the marketplace are quite geographically varied. In this study, we first examined the relationship between changes in managed care penetration at the state level between 1985 and 1993 and the corresponding rates of growth in the incomes of primary care and specialty physicians. Second, we examined the relationship between changes in managed care penetration and changes in the numbers of primary care and specialty physicians per capita for the same period. Finally, we considered national trends in graduating U.S. medical school seniors' matches with specialty programs for the period 1989-1995.

## Methods

We drew on three types of evidence to gauge the impact of managed care on the physician marketplace. First, we used data from the American Medical Association's (AMA) Socioeconomic Monitoring System (SMS) surveys to measure physicians' incomes and involvement in managed care over the period 1985-1993. Second, we used data from the AMA Masterfile<sup>31</sup> and U.S. Census data<sup>32-34</sup> for the same years to examine changes in physician-to-population ratios. Finally, we used data from the National Residency Matching Program to look at the specialty choices of new medical graduates.<sup>35-37</sup>

The SMS is an annual telephone survey of non-Federal, post-residency physicians active 20 hours or more a week in patient care. The SMS is designed to be representative of the patient-care physician population. It has a 60% to 70%

response rate. The number of respondents is approximately 4000 annually, corresponding to 1% of patient-care physicians. The sample for the SMS is drawn from the AMA Masterfile. The AMA Masterfile includes data on the specialty, location, and practice status of all known physicians in the United States. In our analysis of SMS data, responses were weighted for non-response bias (using weights developed by the AMA) by comparing SMS sample frequencies to the distributions of physicians in the AMA Masterfile according to specialty, years of experience, AMA membership, and board certification status. The AMA Masterfile was also our source for data on the overall physician population.

**Measuring managed care penetration.** We examined the relationship between increases in managed care penetration and the growth of primary care and specialty physicians' incomes. This analysis could have been conducted by comparing the incomes of physicians working within and outside of managed care plans or by comparing the incomes of physicians across geographic areas with different levels of managed care penetration. A plan-level analysis could not readily distinguish between differences attributable to the extent of managed care penetration and those that result from physicians and patients sorting into managed care organizations according to other, uncontrolled attributes. Thus, we chose to look across geographic areas.

We used the SMS to construct a measure of managed care penetration at the state level based on the share of physician revenue coming from managed care. From the SMS, we estimated the average percentage of physician revenue in each state that was derived from managed care contracts. We defined this as our indicator of the economic importance of managed care. Our definition included HMOs, PPOs, and POS plans. It excluded income from traditional indemnity plans, which rely at most on utilization review and preauthorization review to "manage" care.

Previous research has focused exclusively on HMO enrollment due to the lack of reliable data on the market shares of other forms of managed care. However, HMOs make up less than one-half of the managed care market. One major advantage of SMS survey data is that they capture a wide range of different types of managed care delivery systems, including newer hybrid network forms that rely on selective contracting. Specifically, the SMS identifies (a) employment in staff-model HMOs, (b) contracting with various types of managed care plans, and (c) the share of physician practice revenues coming from these contracts. We assumed in our analysis that employees of staff-model HMOs receive all of their income from these organizations.

We wished to examine whether physicians in states with the high levels of managed care growth experienced different earnings patterns from those in low managed care growth states. To do this we divided states into categories based on managed care growth. Specifically, we used our measure of managed care penetration to develop an indicator of managed care growth in states as follows: First, we calculated the

percentage of physician revenues coming from managed care in each state in 1985 and 1993. Second, we calculated the percentage change in managed care penetration in each state between 1985 and 1993. Third, we ranked states based on their percentage change in managed care penetration during this period and assigned states to quartiles from high to low. Table 1 shows the states and the range in managed care growth rates associated with each quartile.

**Physician income.** Physician income was defined in this study as net practice income after expenses and before taxes, including contributions into deferred compensation plans but excluding investment income. We computed annualized rates of real (inflation-adjusted) income growth as follows: First, we computed median income by specialty category and by state in 1985 and 1993. We used median income in lieu of mean income to attenuate the effect of outliers. Second, we used the Consumer Price Index (CPI) to adjust median incomes for inflation. Finally, we computed the annualized rates of change in real median income between 1985 and 1993 for specialty categories in each state.

**Specialty classification.** Specialty categories can be broad (such as internal medicine) or narrow (such as pediatric nephrology). We used three categories selected to capture maximum variation in the impact of managed care on differ-

**Table 1. Growth in managed care penetration, 50 U.S. states and District of Columbia, 1985–1993**

Quartile	Percentage increase in physician revenues from managed care
Lowest.....	1.6–10.1
Alabama, Alaska, Arkansas, Delaware, Kentucky, Maine, Mississippi, Montana, Pennsylvania, South Carolina, South Dakota, West Virginia, Wyoming	
Second.....	12.6–15.8
Georgia, Hawaii, Idaho, Indiana, Iowa, New Hampshire, Nevada, New York, North Carolina, North Dakota, Ohio, Oregon, Utah, Wisconsin	
Third.....	17.0–20.9
Arizona, Florida, Illinois, Louisiana, Nebraska, New Mexico, Oklahoma, Rhode Island, Tennessee, Texas, Virginia, Washington DC	
Highest.....	21.4–30.7
California, Colorado, Connecticut, Kansas, New Jersey, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Vermont, Washington state	

ent “types” of physicians while generating sufficient sample sizes to support a state-level analysis. We classified physicians as follows: (a) “primary care physicians,” defined as physicians practicing in general/family practice, general internal medicine, or pediatrics; (b) medical and surgical subspecialists, defined as physicians practicing in either a surgical or internal medicine subspecialty—with exceptions as noted below—and who typically provide little primary care; and (c) “RAPs”—radiologists, anesthesiologists, and pathologists.

For ease of exposition, we refer to medical and surgical subspecialists as “subspecialists,” although subspecialists also exist in some other specialties. We distinguished RAPs from other specialists because they provide virtually no primary care, their services are generally demanded only on referral, and they may be replaced with relatively less disruption to continuity of care. As a result, RAPs may be most vulnerable to cost-cutting efforts by managed care organizations. RAP physicians are also historically closely associated with inpatient hospital services. Research has shown that the largest effect of managed care may be in reducing utilization of inpatient hospital services.<sup>23</sup>

Our three specialty classifications encompass 75% of all active patient-care physicians in the U.S. We excluded physicians with specialties in general surgery, obstetrics and gynecology, emergency medicine, and psychiatry for two reasons. First, it is more difficult to predict the impact of managed care on these specialties than on others. For example, OB/GYNs and general surgeons frequently deliver a mix of primary and specialty care; managed care would have an ambiguous effect on their practices. Second, none of these specialties constituted more than 6% of the SMS physician population in the years we examined, yielding too few physicians at the state level for meaningful analysis. Including these specialties would produce groups that had too much intragroup heterogeneity.

We obtained each physician’s self-designated specialty—that is, the specialty from which they reported deriving most of their practice income—from the SMS survey. In 1993, 33% of all physicians surveyed in the SMS were in “primary care,” 22% were “subspecialists,” and 19% were RAPs. For the 50 states and the District of Columbia, our three-way classification of physicians yielded a potential of 51 observations for each of our three specialty types, or 153 observations total. We dropped state-specialty categories from our analysis if they were based on fewer than five observations (for example, primary care physicians in Alaska), leaving us with a total of 141 useable observations.

**Analysis.** We analyzed growth in physician incomes at the state level for the period from 1985 to 1993. States are sufficiently diverse in terms of the sociodemographic characteristics of their populations, the number and type of physicians, and levels of managed care penetration to support a meaningful analysis. States are also large enough to minimize biases that may result from patient border crossing. However, to the extent that intrastate variation in managed

care penetration is masked by a state-level analysis, our findings may understate the full impact of managed care.

Using multivariate regression, we examined the relationship between changes in managed care penetration and annualized rates of growth in the median incomes of primary care and specialty physicians. We computed regression-adjusted income changes by managed care quartile. In this analysis, states were assigned 0 or 1 "dummy" indicator variables based on their managed care growth quartile. For example, states such as Arkansas and Wyoming, where there was little growth in managed care, scored a value of "1" for the indicator variable corresponding to the lowest managed care quartile and zeros in the other 3 quartile indicators. Our results were robust with respect to alternative specifications of the managed care variables.

To control for other factors affecting the demand for physician services, we chose control variables designed to capture the effects of differences in the socioeconomic and demographic characteristics of the population and of insurance status. These variables included the birth rate, the percentage of the population under age 5, the percent of the population over age 65, the percent of the population that was non-white, the percent of the population that was urban, and per capita income. For all of the independent control variables as well as the dependent variable, median physician income, we computed annualized rates of change for the period 1985–1993 using 1985 and 1993 data.

We used the annualized rate of change in physician income, rather than the income level, as the dependent variable in order to minimize the effect of uncontrolled or unobserved state-level factors that were unrelated to managed care growth but may have confounded a cross-sectional analysis. We employed weighted least squares in our regressions to control for error potentially introduced into our regression estimates by differences in the size of the physician sample across states.

**Physician supply.** We examined the relationship between changes in managed care penetration and annualized rates of growth of the supply of primary care and specialty physicians per capita. Again, we conducted this analysis at the state level for the period 1985–1993 and used multivariate regression. As in the income regressions, above, we captured the impact of managed care by using indicators for managed care quartiles and including sociodemographic variables to explain local variations in the supply of and demand for physician services. We expected to find changes in the primary care physician-to-population ratio to be positively related to managed care growth, and growth in specialist physician-to-population ratios to be negatively related to managed care. Physicians incur substantial costs in relocating or changing established practices; hence adjustments in the numbers of physicians may occur less rapidly than adjustments in compensation.

We constructed state and specialty group-specific physician-to-population ratios to gauge variations in per capita

physician supply. Only non-Federal, patient care physicians were included. Data on physicians' locations and self-designated specialties were drawn from the AMA Masterfile.<sup>31</sup> State population figures were taken from U.S. Census estimates for resident populations. Population projections compiled by the U.S. Census Bureau were used to extrapolate population figures from the 1980 Census to 1985 and for the 1990 Census to 1993.<sup>32–34</sup> We computed annualized rates of growth in physicians per capita at the state level for each of our three physician specialty groups, yielding a total of 153 observations.

**Residency match data.** Finally, we examined national trends in choices of specialty training by U.S. medical school seniors using data from the National Residency Matching Program for the period 1989–1995. To the extent recent regional changes portend long-term national trends, we expected to find medical students increasingly selecting residencies in primary care.

The National Residency Matching Program (NRMP) matches graduating medical school seniors and foreign medical graduates with participating graduate residency training programs. The majority of matches are for programs beginning in the students' first postgraduate year (PGY-1). However, some specialty programs do not begin until the second postgraduate year (PGY-2), following a transitional year. The NRMP matches some students simultaneously to PGY-1 transitional positions and certain PGY-2 programs. Some postgraduate positions, such as for medical subspecialties, may be filled outside the match.

We examined PGY-1 and PGY-2 positions offered to and filled by U.S. medical school graduates through the NRMP from 1989 through 1995.<sup>35–37</sup> U.S. graduates usually have first choice of positions, so their fill rates reflect the demands for training in different specialties. Residents in family practice, pediatrics, and internal medicine may become primary care practitioners; however, because many PGY-1 internal medicine residents complete subsequent subspecialty training, we excluded them from our analysis and considered only PGY-1 residencies in family practice and pediatrics as indicators of trends in primary care. Nor did we examine whether doctors who initially selected a family practice or pediatrics residency chose to specialize later on. We examined PGY-1 and PGY-2 match data for surgical specialists as indicators of trends in subspecialty training. We looked at PGY-1 and PGY-2 match data for programs in diagnostic radiology, anesthesiology, and pathology as indicators of trends in training for RAP specialties. We limited our analysis to the period 1989–1995; because of changes in the number of PGY-2 programs that participated in the match, earlier data are not fully comparable.

## Results

**Physician incomes.** We performed separate regression equations for each of the three specialty groups we consid-

**Table 2. Growth in physician income by quartile, 1985–1993**

Quartile	Increase in median real physician income								
	Primary care			Subspecialists			Radiologists, anesthesiologists, and pathologists		
	Annual growth rate <sup>a</sup>	Real dollar change <sup>b</sup>	P	Annual growth rate	Real dollar change	P	Annual growth rate	Real dollar change	P
Lowest	1.20	7,448	0.04 <sup>c</sup>	3.15	39,417	0.03 <sup>c</sup>	4.14	58,558	0.01 <sup>c</sup>
Second	3.27	21,705	... <sup>e</sup>	3.62	46,109	... <sup>e</sup>	3.30	45,450	... <sup>e</sup>
Third	3.63	24,489	0.03 <sup>d</sup>	4.08	52,743	... <sup>e</sup>	3.27	44,802	... <sup>e</sup>
Highest	4.78	33,526	0.05 <sup>d</sup>	2.55	31,260	... <sup>e</sup>	0.14	1,701	0.03 <sup>d</sup>
P-value, all quartiles equal			0.01 <sup>f</sup>			... <sup>g</sup>			0.01 <sup>f</sup>

<sup>a</sup>Annualized percentage rate of growth in median real physician income.

<sup>b</sup>Cumulative real dollar growth in median physician income.

<sup>c</sup>Significantly different from zero.

<sup>d</sup>Significantly different from the lowest quartile.

<sup>e</sup>Not significantly different from the lowest quartile.

<sup>f</sup>Significantly different from each other.

<sup>g</sup>Not significantly different from each other.

ered: primary care, subspecialists, and RAPs. We found significant evidence that the growth of managed care was associated with a relative increase in primary care earnings and a decrease in the earnings of some specialists. Table 2 shows the relationship between the growth of managed care and inflation-adjusted changes in median physician income, by specialty grouping. Results for the control variables are not reported but are available on request from the authors.

Income growth for primary care physicians differed significantly across managed care quartiles ( $P < 0.01$ ), with income growing more rapidly in states with high growth in managed care than in states with low growth in managed care. In the states with the fastest managed care growth, the median, inflation-adjusted, income of primary care physicians grew at an annualized rate of over 4.78%, and there was a cumulative gain in real median income of \$33,526. However, inflation-adjusted incomes of primary care physicians rose annually by only 1.2% in states with the lowest levels of managed care growth; cumulative, inflation-adjusted income growth equaled only an average of \$7448 in these states.

Income gains for RAP physicians also varied with respect to managed care ( $P < 0.01$ )—however, in the opposite direction from that of their primary care colleagues. Incomes of RAP physicians grew significantly more slowly in states with high managed care growth. In the states with the fastest managed care growth, the median inflation-adjusted income of RAP physicians grew at an annual rate of less than 1%, or \$1701. In states with the lowest rates of managed care growth, RAP incomes grew at a rate of over 4%, equal to gain of over \$58,000 in inflation-adjusted earnings. The difference between the first and fourth quartiles was statistically significant at the  $P = 0.03$  level.

The results for subspecialists were less compelling, and the statistical and economic significance of the differences in income growth across quartiles was much weaker ( $P = 0.08$ ). Subspecialists in states with the lowest managed care growth saw practice earnings rise by 3.15% annually, or over \$39,000 cumulatively in inflation-adjusted dollars, while subspecialists in states with the highest levels of managed care growth saw practice earnings rise by only 2.55%, or a cumulative gain in inflation-adjusted income of \$31,000 between 1985 and 1993. However, this difference was not statistically significant.

**Physician supply.** Table 3 reports changes in the specialty-specific physician supply broken down by managed care growth quartiles. We measured physician supply by looking at the physician-to-population ratio. We found evidence of a relative decline in the supply of specialist and RAP physicians in market areas characterized by high managed care growth. The primary care physician-to-population ratio increased at a slower rate than the ratios for subspecialists and RAP physicians in all managed care growth quartiles.

We found significant differences across specialty groups and managed care quartiles consistent with the patterns of growth in earnings described above. States with the fastest growth of managed care (fourth quartile) experienced lower growth of subspecialist-to-population and RAP physician-to-population ratios, although only the results for RAPs are statistically significant ( $P = 0.04$ ). RAP physician-to-population ratios rose 40% faster in states in the lowest managed care growth quartile than in states experiencing the highest degrees of managed care growth.

The results for primary care physicians do not strongly corroborate the premise that managed care will be linked to

**Table 3. Changes in physician supply, by quartile, 1985–1993**

	Annualized percentage increase in physician-to-population ratio					
	Primary care		Subspecialists		Radiologists, anesthesiologists, and pathologists	
	Increase	P	Increase	P	Increase	P
Lowest .....	1.57	0.04 <sup>a</sup>	2.83	0.02 <sup>a</sup>	3.33	0.01 <sup>a</sup>
Second .....	1.88	... <sup>c</sup>	2.93	... <sup>c</sup>	3.11	... <sup>c</sup>
Third .....	1.98	0.05 <sup>b</sup>	2.80	... <sup>c</sup>	2.77	... <sup>c</sup>
Highest .....	1.45	... <sup>c</sup>	2.04	... <sup>c</sup>	2.35	0.04 <sup>b</sup>
P-value, all quartiles equal .....		0.03 <sup>d</sup>		... <sup>e</sup>		0.02 <sup>d</sup>

<sup>a</sup>Significantly different from zero.<sup>b</sup>Significantly different from the lowest quartile.<sup>c</sup>Not significantly different from the lowest quartile.<sup>d</sup>Significantly different from each other.<sup>e</sup>Not significantly different from each other.

strong growth in employment opportunities for primary care physicians. States in the middle quartiles of managed care growth experienced significantly higher increases in primary care physician-to-population ratios than did states in the lowest quartile ( $P < 0.05$ ). However, the growth in primary care physicians per capita was lowest for states with the highest levels of managed care growth ( $P = 0.05$ ).

**Specialty choice.** Table 4 shows the number of PGY-1 and PGY-2 positions, broken down by specialty, that were offered in the NRMP match and the proportion that were filled by U.S. medical school graduates for the period 1989–1995.<sup>35–37</sup> For family practice and pediatrics programs we noted a general increase in the proportion of positions that were filled—rising from approximately 60% in

1989 to over 70% in 1995. These numbers understate the movements into primary care programs during the same period; in response to rising demand, many programs increased the number of positions. Between 1989 and 1995 the number of family practice and pediatric positions increased by 10.8%, and the number filled increased by 31.5% (from 2696 filled in 1989 to 3546 filled in 1995.)

We found modest evidence of an increase in the attractiveness of surgical specialty training in the early part of our study period, followed by stable numbers of positions and matches. Between 1989 and 1993, the number of positions increased from 553 to 708, with no change in the proportion of positions filled. Since 1993, both the number of residency positions and the proportion filled have remained relatively constant.

**Table 4. Selected specialty PGY-1 and PGY-2 positions offered and filled by U.S. medical school graduates, 1989–1995**

Program	1989		1991		1993		1995	
	Number of slots	Percent filled	Number of slots	Percent filled	Number of slots	Percent filled	Number of slots	Percent filled
Primary care: PGY-1								
Family practice .....	2456	59.8	2487	55.7	2589	63.2	2941	70.8
Pediatrics .....	2012	61.0	2009	64.6	2008	66.7	2009	72.9
Specialties: PGY-1								
Surgical specialty .....	553	87.6	647	85.8	708	85.9	706	87.4
RAPs <sup>a</sup> .....	1112	64.3	1226	70.0	1259	65.0	1167	59.4
Anesthesiology .....	293	68.4	329	76.1	325	61.2	251	37.1
Support specialties: PGY-1+PGY-2								
RAPs .....	2285	68.6	2630	71.0	2811	64.3	2619	52.0
Anesthesiology .....	1053	70.0	1292	73.1	1419	58.6	1153	38.3

<sup>a</sup>Radiologists, anesthesiologists, and pathologists.

PGY-1 = first postgraduate year

PGY-2 = second postgraduate year



We present information on both PGY-1 and PGY-2 positions for RAP programs, in aggregate, and for programs in anesthesiology in particular. Between 1989 and 1995, the number of PGY-1 and PGY-2 RAP positions increased by 14%, peaking in 1993. The number of U.S. medical school graduates matched to these positions fell by over 15%, resulting in a declining proportion of RAP training positions filled. Virtually all of the decline was accounted for by positions in anesthesiology; the proportion of anesthesiology positions filled plummeted from 70% in 1989 to 37% in 1995.

## Discussion

We have presented nationally representative economic evidence which indicates that the growth of managed care has had substantial effects on the physician marketplace. The incomes of primary care physicians grew most rapidly, and the incomes of RAP physicians least rapidly, in markets characterized by a high managed care growth. The incomes of medical and surgical subspecialists also lagged in markets with the highest managed care growth, although the results for the specialist group were less significant both economically and statistically. These findings suggest that growth in managed care is significantly altering the relative compensation and employment of primary care and specialist physicians.

Results of the SMS survey of 1994 physician income have been recently released by the AMA and analyzed by researchers.<sup>38-39</sup> While we do not have comparable location data and can not formally extend the study to include the 1994 time period, the income trends noted by these researchers for 1994 are generally consistent with a continuation of the patterns we have documented. Overall, average physician income fell by 4% in 1994. Median incomes for general/family practitioners were relatively unchanged from 1993 levels. Virtually all measured categories of medical and surgical subspecialists recorded a decline in net income, although the magnitudes varied. It is notable that subspecialists suffered significant declines in earnings between 1993 and 1994, while the earnings of RAP physicians declined more modestly. These findings may signal that efforts to contain physician costs are moving from hospital services into more broadly defined specialty services.

Over time, physicians will tend to migrate to those areas that offer superior compensation and working conditions. Our findings for RAP physicians are consistent with this prediction. States with the highest managed care growth had the lowest increases in RAP physician-to-population ratios. A similar pattern of growth was documented for

medical and surgical subspecialists, although results were not statistically significant. Our failure to document managed care-related patterns in subspecialist location are congruous with our lack of strong findings that managed care has altered subspecialist earnings.

We find an inverted U-shaped relationship between managed care growth and increases in the primary care physician-to-population ratio. There are at least two potential explanations that may account for both the slow increase in numbers of primary care physicians and the relatively higher rates of growth in primary care income in high managed care markets. First, there may be significant negative nonfinancial disincentives for delivering primary care in a managed care environment. Second, it is possible that managed care organizations were attracted to areas that already had high numbers of primary care physicians so that even if competing managed care organizations bid up incomes, the need for additional primary care physicians was small and growth rates were low. This suggests a need to consider the degree to which conditions in the physician marketplace may be contributing to the growth in managed care.

Finally, evidence from the National Residency Match Programs indicates that since 1989, residency programs have opened new positions in primary care and that a grow-

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ing number of young physicians are electing to fill them. At the same time, programs are reducing the number of positions in selected specialties and fewer young physicians are electing to fill them.

Taken together, our results suggest there is more to managed care than sorting patients; these results are consistent with substantial market-level impacts on the relative incomes of primary care and specialty physicians and on specialists per capita. In addition, evidence from the specialty choices of new medical graduates suggests that in the long run the changes we have documented with respect to physician earnings could translate into substantial changes in the relative numbers of primary care and specialist physicians.

Turning to possible public policy implications of our



findings, we note that there has been considerable debate about the impact of managed care on health care costs. There is little conclusive evidence that managed care has generated large and widespread savings. Our findings do not provide any direct evidence on the impact of managed care on health care costs. However, they suggest that there has been a change in the relative use of primary care and specialty physicians, which has been identified as an important potential source of cost savings.

Our findings also have implications for workforce policy. Public policy makers need to take into account ongoing market adjustments in physician supply and compensation in developing workforce policy. In particular, we have seen indications of significant adjustments in both location and specialty choice over relatively short time frames.

Finally, based on our research, what are the important aspects of the medical marketplace to watch in the future? There are many possible margins on which adjustments to managed care may occur. We have examined only a few of the most obvious. A host of issues remain to be explored. For example, what accounts for the kind of market-level effects that we have observed on income? Is managed care altering incomes primarily through changes in volume, compensation per unit of service, or both? Do the effects of managed care on individual physicians vary with their level of involvement in managed care? And to what degree is managed care changing what physicians do as well as well as relative demand for different types of physicians? Beyond this, a key issue is what forces are driving changes associated with managed care? Managed care organizations have been evolving rapidly over the past decade. An important question is the degree to which effects vary between plan types and why. A closely related issue is the role of market structure. For example, how important is the level of competition in markets for provider services in explaining the growth and impact of managed care? And is managed care itself altering market conditions in ways that may affect its future impact?

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